Complete Summary

GUIDELINE TITLE

Recommendations for the diagnosis and management of vitamin D deficiency in adults.

BIBLIOGRAPHIC SOURCE(S)

University of Texas at Austin, School of Nursing, Family Nurse Practitioner Program. Recommendations for the diagnosis and management of vitamin D deficiency in adults. Austin (TX): University of Texas at Austin, School of Nursing; 2009 May. 16 p. [40 references]

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Vitamin D deficiency

GUIDELINE CATEGORY

Diagnosis
Management
Prevention
Screening
Treatment

CLINICAL SPECIALTY

Family Practice
Geriatrics
Internal Medicine
Nursing
Nutrition

INTENDED USERS

Advanced Practice Nurses
Dietitians
Nurses
Pharmacists
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To assist health care providers with current evidence-based practice guidelines in reference to diagnosis and management of vitamin D deficiency in adult patients

TARGET POPULATION

Non-pregnant, non-lactating adults older than 18 years at risk for vitamin D deficiency

Note: Patient with malabsorption syndrome, kidney and hepatic disease, and obesity may require different treatment not discussed in this guideline.

INTERVENTIONS AND PRACTICES CONSIDERED

Diagnosis/Evaluation/Screening

1. Screening patients with personal or medical history that places them at risk for vitamin D deficiency
2. Physical examination including general appearance, vital signs, height and weight, general skin assessment, and assessment for bone pain
3. Serum 25-hydroxyvitamin D (25OHD) concentrations

Treatment/Management

1. Vitamin D2 or D3
2. Adequate sun exposure
3. Re-measurement of 25OHD

MAJOR OUTCOMES CONSIDERED

- Serum 25-hydroxyvitamin D level
- All-cause morbidity and mortality
- Musculoskeletal and general health

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Searches were performed via Electronic databases including Medline, Cumulative Index to Nursing and Allied Health Literature (CINAHL), and PubMed, UpToDate, and Cochrane. Additional resources were found using bibliographies of relevant articles and brochures.

Keyword used: "vitamin D," "vitamin D deficiency," "25-Hydroxyvitamin D," "hypovitaminosis D"

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Quality of Evidence

(Based on U.S. Preventive Services Task Force [USPSTF] Ratings)

Good: Evidence includes consistent results from well-designed, well-conducted studies in representative populations that directly assess effects on health outcomes.

Fair: Evidence is sufficient to determine effects on health outcomes, but the strength of the evidence is limited by the number, quality, or consistency of the individual studies, generalizability to routine practice, or indirect nature of the evidence on health outcomes.

Poor: Evidence is insufficient to assess the effects on health outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or lack of information on important health outcomes.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus
Informal Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

The U.S. Preventive Services Task Force (USPSTF) grades its recommendations according to one of five classifications (A, B, C, D, I) reflecting the strength of evidence and magnitude of net benefit (benefits minus harms).

A. The USPSTF strongly recommends that clinicians provide the service to eligible patients. The USPSTF found good evidence that the service improves important health outcomes and concludes that benefits substantially outweigh harms.

B. The USPSTF recommends that clinicians provide this service to eligible patients. The USPSTF found at least fair evidence that the service improves important health outcomes and concludes that benefits outweigh harms.

C. The USPSTF makes no recommendation for or against routine provision of the service. The USPSTF found at least fair evidence that the service can improve health outcomes but concludes that the balance of benefits and harms is too close to justify a general recommendation.

D. The USPSTF recommends against routinely providing the service to asymptomatic patients. The USPSTF found at least fair evidence that the service is ineffective or that harms outweigh benefits.

I. The USPSTF concludes that the evidence is insufficient to recommend for or against routinely providing the service. Evidence that the service is effective is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Family Nurse Practitioner students developed a draft which was submitted to the University of Texas at Austin nursing faculty for review. Revisions were made after recommendations were received. An outside specialist provided final external review.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Strength of recommendations (**A, B, C, D, I**) and quality of evidence (**good, fair, poor**) are defined at the end of the "Major Recommendations" field.

Diagnosis

1. Consider screening patients who report a current or past medical history of the following:
    - Chronic musculoskeletal pain including fibromyalgia (Cannell & Hollis, 2008; Holick, 2007; Lyman, 2005; Leventis & Patel, 2008; Bischoff-Ferrari, Orav, & Dawson-Hughes, 2006) **(Grade A, Evidence Good)**.
    - Osteoporosis (Holick, 2007; Lyman, 2005; Leventis & Patel, 2008; Cannell & Hollis, 2008; Bischoff-Ferrari et al., 2009; Bischoff-Ferrari, Orav, & Dawson-Hughes, 2006; Autier and Gandini, 2007) **(Grade A, Evidence Good)**.
    - Rheumatoid arthritis (Leventis & Patel, 2008; Holick, 2007; Cannell & Hollis, 2008; Mouyis et al., 2008; Plotnikoff & Quigley, 2003) **(Grade A, Evidence Good)**.
    - Malabsorption syndromes (Holick, 2007; Agus & Drezner, 2008; Johnson et al., 2006) **(Grade A, Evidence Good)**.
    - Obesity, metabolic syndromes, and type II diabetes (Holick, 2007; Giovannucci et al., 2008; Cannell & Hollis, 2008; Konradsen et al., 2008; Rodriguez-Rodriguez et al., 2009; Pittas et al., 2007; Mattila et al., 2007; Melamed et al., 2008) **(Grade B, Evidence Fair)**.
    - Cardiovascular disease (Martins et al., 2007; Autier & Gandini, 2007; Lee et al., 2008) **(Grade A, Evidence Good)**.
    - Chronic kidney disease and hyperparathyroidism (Holick, 2007; Agus & Drezner, 2008; Cuppari & Garcia-Lopez, 2009; Dusso, Brown, & Slatopolsky, 2005) **(Grade B, Evidence Fair)**.
    - Depression (Berk et al., 2007; Wilkins et al., 2006; Murphy & Wagner, 2008; Holick, 2007) **(Grade B, Evidence Fair)**.
    - High risk population such as elderly (over 71 years of age) and dark-skinned individuals (Bischoff-Ferrari et al., 2004; Agus & Drezner, 2008; Cannell & Hollis, 2008; Holick, 2007; Lyman, 2005; National Institutes of Health, 2008) **(Grade A, Evidence Good)**.

- Chronic use of corticosteroids (Holick, 2007; Lyman, 2005; Leventis & Patel, 2008; Cannell & Hollis, 2008) **(Grade A, Evidence Good)**.
- Personal/social history of inadequate sun exposure (e.g., working indoors, homebound, living in higher latitude, wearing excessive clothing, dark skinned and use of sun block) and insufficient dietary intake of vitamin D fortified foods (Holick, 2007; Lyman, 2005; Leventis & Patel, 2008; Cannell & Hollis, 2008; Cranney et al., 2007) **(Grade A, Evidence Good)**.

2. Physical exam including general appearance, vital signs, height and weight, general skin assessment, skin color, and assessment for bone pain* may provide the examiner with clues to possible vitamin D deficiency (Cannell & Hollis, 2008; Holick, 2007) **(Grade B, Evidence Fair)**.
3. Diagnostic tests as indicated: serum 25-hydroxyvitamin D (25OHD) concentrations (Holick, 2007; Heaney, 2008; Lyman, 2005; Leventis & Patel, 2008; Cannell & Hollis, 2008; Cranney et al., 2007; Cashman et al., 2008) **(Grade A, Evidence Good)**.

*Bone pain due to vitamin D deficiency is best assessed by using moderate force to press the thumb on the sternum or anterior tibia, which can elicit bone pain (in some cases can be a sign of osteomalacia) (Cannell & Hollis, 2008).

Maintenance

- Daily oral recommended vitamin D requirements. Adequate intake: adults 18 to 50 – 200 international units (IU); 51 to 70 – 400 IU with adequate sun exposure (Institute of Medicine, 1999; Cannell & Hollis, 2008; Bischoff-Ferrari et al., 2004; Lyman, 2005) **(Grade C, Evidence Poor)**.
- Without adequate sun exposure and for high risk population such as elderly (over 65 years of age) and dark-skinned individuals the recommendation is 800 to 1000 IU per day (Bischoff-Ferrari et al., 2009; Holick, 2007; Cranney et al., 2007; U.S. Department of Health and Human Services, 2005) **Grade A, Evidence Good)**.
- Adequate sun exposure is defined as sun exposure to arm and legs 5 to 30 minutes depending on time of day, season, latitude, and skin pigmentation between 10a and 3p; twice weekly is often adequate (Holick, 2007) **(Grade C, Evidence Fair)**

Pharmacological Therapy to Treat Vitamin D Deficiency

- Nutritional deficiency (25OHD <20 ng/ml [50 nmol/L]) requires initial treatment with 50,000 IU of vitamin D2 or D3 orally once per week for six to eight weeks (may take longer depending on starting 25OHD level), and then 800 to 1000 IU of vitamin D3 daily thereafter (Dawson-Hughes, 2008; Lyman, 2005; Holick, 2007). Intramuscular cholecalciferol (300,000 U) in one or two doses per year is also an option for increasing serum 25OHD levels (de Torrente de la Jara, Pecoud, & Favrat, 2006) **(Grade A, Evidence Good)**.
- Nutritional insufficiency (25OHD 20 to 30 ng/ml [50 to 75 nmol/L]) requires treatment with 800 to 1000 IU of vitamin D3 daily. This intake will bring the average adult to 30 ng/ml (75 nmol/L) over a three month period, but many individuals will need higher doses (Lyman, 2005; Holick, 2007) **(Grade B, Evidence Fair)**.
- 25OHD concentrations should be measured approximately eight to twelve weeks after initiating therapy. The dose of vitamin D may require adjustment

depending upon individual absorption (Dawson-Hughes, 2008; Holick, 2007) **(Grade B, Evidence Fair)**.

Definitions:

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Grading of Recommendations (Based on U.S. Preventive Services Task Force [USPSTF] Ratings)

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CLINICAL ALGORITHM(S)

A clinical algorithm is provided in the original guideline document for Diagnosis and Management of Vitamin D Deficiency.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of evidence is identified and graded for all recommendationsÂ (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate diagnosis and management of vitamin D deficiency in the adult population

POTENTIAL HARMS

Vitamin D intoxication is extremely rare and does not seem to occur when levels of 25-hydroxyvitamin D are <150 ng/ml (374 nmol/L). Intoxication of vitamin D produces syndrome characterized by hypercalciuria, hypercalcemia, renal stone, renal calcification with renal failure, and death. Doses over 50,000 IU/day are associated with increased likelihood of toxicity. It is important to inquire about additional dietary supplements (some of which contain vitamin D) that patients may be taking before prescribing extra vitamin D.

Caution with vitamin D2 is required in patients with:

- Malabsorption syndrome
- Hyperphosphatemia
- Renal stones
- Impaired renal function
- Cardiovascular disease

CONTRAINDICATIONS

CONTRAINDICATIONS

Contraindication to vitamin D2 (ergocalciferol):

- Hypersensitivity to drug/class/component
- Hypercalcemia
- Hypervitaminosis D
- Renal osteodystrophy
- Caution if malabsorption syndrome
- Caution if hyperphosphatemia
- Caution if renal stones

- Caution if impaired renal function
- Caution if cardiovascular

QUALIFYING STATEMENTS

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Patients with malabsorption syndrome, kidney and hepatic disease, and obesity may require different treatment not discussed in this guideline.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

University of Texas at Austin, School of Nursing, Family Nurse Practitioner Program. Recommendations for the diagnosis and management of vitamin D deficiency in adults. Austin (TX): University of Texas at Austin, School of Nursing; 2009 May. 16 p. [40 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2009 May

GUIDELINE DEVELOPER(S)

University of Texas at Austin School of Nursing, Family Nurse Practitioner Program - Academic Institution

SOURCE(S) OF FUNDING

University of Texas at Austin, School of Nursing, Family Nurse Practitioner Program

GUIDELINE COMMITTEE

Practice Guidelines Committee

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Committee Members: Lesa Droste, RN, MSN, FNP; Janice Hernandez, RN, MSN, FNP; Courtney Holmes, RN, MSN, FNP; Marina Mahdjoubi, RN, MSN, FNP

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: None available.

Print copies: Available from the University of Texas at Austin, School of Nursing. 1700 Red River, Austin, Texas, 78701-1499

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI Institute on February 5, 2010. The information was verified by the guideline developer on April 26, 2010.

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